REMARKS

In response to the office action mailed on January 15, 2008, Applicant amended claims 47, 48, 52, 68-70, and 74, and withdrew claims 75-80. Claims 1-12, 14-18 and 23-74 are presented for examination.

The Examiner rejected claims 48, 69, and 70 under 35 U.S.C. §112, 2nd paragraph as being indefinite. Applicant amended these three claims to obviate this rejection, so the rejection should be withdrawn.

The Examiner rejected claims 1-12, 14-18, 23-42, 53-62, and 64-69 under 35 U.S.C. §103(a) as being obvious over Scher et al. U.S. Patent 6,878,871 ("Scher") in view of Chirvase et al., Journal of Applied Physics, Vol. 93, No. 6, pages 3376-3383 ("Chirvase").

Claims 1-12, 14-18, 23-42, 53-62, and 64-69, as amended, require photovoltaic cells containing a mesh electrode and a fullerene. In making the rejection, the Examiner asserted that

> "It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the photovoltaic cell of Scher et al. by using fullerene as taught by Chirvase et al. in place of the nanocrystals for the electron acceptor material, because Chirvase et al. teaches the combination of conjugated polymer such as P3HT and fullerene would improve the efficiency of polymer solar cells." *See* the office action, page 5, 2nd last paragraph.

Applicant disagrees. Chirvase teaches that the P3HT-fullerene photovoltaic cell described therein has an efficiency of only 0.2%. *See*, e.g., the Abstract. By contrast, an object of Scher is to develop photovoltaic cells having an efficiency better than current photovoltaic cells, which generally have an efficiency of about 10% (*see*, e.g., column 1, lines 51-57 and column 2, lines 16-20), 50 times as high as the efficiency of the photovoltaic cell described in Chirvase. Thus, in view of Chirvase, one skilled in the art would not have wanted to replace the nanocrystals used in the photovoltaic cells described in Scher with the fullerene described in Chirvase to provide photovoltaic cells required by claims 1-12, 14-18, 23-42, 53-62, and 64-69, at least because the result would be a photovoltaic cell with a much lower efficiency than explicitly desired by Scher. Indeed, Scher states that his photovoltaic cells provide increased efficiency, decreased manufacturing costs, greater flexibility and/or reasonable durability and/or

longevity. *See* column 2, lines 15-22. Thus, in view of Scher, one skilled in the art would also have not been motivated to modify the photovoltaic cells described in Scher to provide the photovoltaic cells required by claims 1-12, 14-18, 23-42, 53-62, and 64-69 because Scher contends that his photovoltaic cells provide a combination of many desirable properties that was not previously available.

Further, Applicant would like to point out two additional grounds establishing that one skilled in the art would not have wanted to combine Scher and Chirvase:

First, Scher describes photovoltaic cells having a nanocrystal component in the photoactive layer. *See*, e.g., the abstract and column 3, lines 10-16. The nanocrystal component contains at least two inorganic materials (or two populations of nanostructures), one of the two inorganic materials including an n-type semiconductor (i.e., an electron acceptor material) and the other including a p-type semiconductor (i.e., an electron donor material) such that these two inorganic materials exhibit a type II band offset energy profile. *See*, e.g., column 7, lines 1-10. By contrast, the photovoltaic cell described in Chirvase has a very different design. It uses a fullerene as an electron acceptor material and P3HT as the electron donor material in the photoactive layer. *See*, e.g., the Abstract. The Examiner contends that it would have been obvious to replace the nanocrystal component described in Scher (i.e., a combination of electron donor and acceptor materials) with the fullerene described in Chirvase (i.e., a single electron acceptor material). However, because a type II band offset energy profile is only exhibited in a heterojunction between p-type and n-type semiconductor materials (i.e., electron donor and acceptor materials), the fullerene described in Chirvase would not exhibit such a type II energy profile by itself. Thus, one skilled in the art would not have wanted to substitute a fullerene described in Chirvase for the two inorganic materials described in Scher because it would be contrary to Scher's teaching in that the results would be photovoltaic cells containing a material that does not exhibit type II band offset energy profile.

Second, Scher teaches using inorganic semiconductor materials in the photoactive layer to absorb light and generate excitons. *See*, e.g., column 14, lines 59-63. By contrast, in the P3HT-fullerene photovoltaic cell described in Chirvase, fullerene has only weak visible light absorption, while P3HT absorbs visible light that generates excitons. *See*, e.g., Chirvase, page 3377, left column, 1st paragraph and FIG. 1. Thus, one skilled in the art would not have wanted

to replace the inorganic semiconductor materials in the photovoltaic cells described in Scher with the fullerene described in Chirvase because the results would be photovoltaic cells that only have weak visible light absorption and therefore low efficiencies.

In view of the foregoing, Applicant requests reconsideration and withdrawal of this rejection.

The Examiner rejected claims 43-52 and 70-74 under 35 U.S.C. §103(a) as being obvious over Scher in view of Chirvase and further in view of Chapin et al., U.S. Patent 2,780,765 ("Chapin"). The Examiner rejected claim 63 under 35 U.S.C. §103(a) as being obvious over Scher in view of Chirvase and further in view of Griffin, U.S. Patent 3,442,007 ("Griffin").

Claims 43-52, 63, and 70-74, as amended, require photovoltaic cells containing a mesh electrode and a fullerene. As discussed above, one skilled in the art would not have wanted to combine Scher with Chirvase to provide such photovoltaic cells. Chapin describes a photovoltaic cell containing monocrystalline silicon with a p-n junction. *See*, e.g., claim 1 and column 2, lines 28-30. Griffin describes affixing a collector grid on the barrier of a cadmium sulfide solar cell. Similar to Scher, neither Chapin nor Griffin teaches or even suggests using a fullerene in a photovoltaic cell. Thus, one skilled in the art would not have combined Chapin or Criffin with Scher and Chirvase to provide the photovoltaic cells required by claims 43-52, 63, and 70-74. Even if these four references were combined, the results would not be the photovoltaic cells required by these claims. Accordingly, Applicant requests reconsideration and withdrawal of these two rejections.

The Examiner provisionally rejected claims 1-12, 14-18, and 23-74 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-39 of co-pending Application No. 11/033,217 in view of Scher. Applicant requests that this rejection be held in abeyance until the pending claims are otherwise in condition for allowance.

Please apply any charges to deposit account 06-1050, referencing Attorney's Docket No. 15626-006001.

Respectfully submitted,

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